

Water Quality Concerns

Water quality requirements for textile wet processing are hard to define due to the different requirements for each fiber, process and final product quality. Generally, process water should have:

- ◆ Little or no chlorine
- ◆ Low metals content, specifically iron and copper
- ◆ Low salts concentrations, specifically chloride and sulfate
- ◆ Water quality consistency

Water delivered to dyeing and finishing operations is usually adjusted prior to and during processing. While some of the recycled water constituents are greater than those for potable water, the recycled water quality is more consistent than potable water quality. Consistent water quality reduces the amount of chemical monitoring, analysis, and adjustment.

Water Quality Comparison

Constituent	Potable Water			Recycled Water
	State Project Water	Colorado River Water Blend	Groundwater	
Alkalinity (CaCO3) (mg/L)	97	112	181	198
Aluminum (mg/L)	0	0.14	<0.05	NA
Chloride (mg/L)	64	76	45	116
Chlorine (mg/L)	2	2	NA	3.7
Color (mg/L)	2	1.2	4.8	NA
Copper (mg/L)	<0.05	<0.05	<0.05	0.03
Heavy Metals (mg/L)	0	0.002	NA	NA
Iron (mg/L)	<0.1	<0.1	0.36	0.08
Manganese (mg/L)	<0.02	<0.02	0.09	0.02
pH	8	8.1	7.7	7.0
Sulfate (mg/L)	68	174	110	101
TSS* (mg/L)	NA	NA	NA	1.7
TDS** (mg/L)	305	487	419	569
Total Hardness (mg/L)	147	241	227	217

NA – Not available
*Total Suspended Solids
**Total Dissolved Solids

Water Consumption

Fabric Type	Water Usage (gal/lb)		
	Minimum	Median	Maximum
Wool	13.3	34.1	78.9
Woven	0.6	13.6	60.9
Knit	2.4	10.0	45.2
Stock/Yarn	0.4	12.0	66.9
Non-woven	0.3	4.8	9.9
Felted Fabrics	4.0	25.5	111.8

For more information, please visit
www.centralbasin.org
www.westbasin.org
www.dwr.water.ca.gov

17140 S. Avalon Blvd., Suite 210
Carson, Ca 90746
(310) 217-2222

Challenging the Dye Master:

Ground Breaking Application
of Recycled Water to the
Cellulose Dye Process

Contributing authors
Scott Goldman - Water 3 Engineering
Fawzi Karajeh - California Department of Water Resources
Julie Mottin - Central Basin and West Basin Municipal Water Districts



West Basin MWD



California Department
of Water Resources



Central Basin MWD

Background

Central Basin Municipal Water District (MWD) is a public agency that wholesales imported and recycled water to cities, mutual water companies, investor-owned utilities, and private companies. Central Basin MWD serves a population of 1.5 million people living within 24 cities in southeast Los Angeles County, as well as unincorporated County areas.

Textile finishing processes, carpet and fabric dyeing are very water-intensive and, as a result, these facilities are some of the largest industrial water users in Central Basin MWD. Several carpet-dyeing installations in Southern California have been successfully using recycled water in their operations for a number of years. Fabric dyers have not viewed the success of the carpet dyers with recycled water as indicative of the applicability to their industry. Fabric dyers use many more cloth types than carpet manufacturers and very little color variation between batches can be tolerated.

Benefits of Recycled Water to Dye Houses

Reliability – Supply reliability increases dramatically when using recycled water because the supply is not affected by drought conditions.

Consistent Water Quality – Unlike the potable supply, with widely-varying quality depending on the source water, the recycled water quality is very consistent due to the consistency of the wastewater supply.

Reduced Water Costs – Central Basin MWD wholesales recycled water to local purveyors at approximately 60% the cost of potable water. The savings to the end-user can vary in the range of 10% to 35% depending on the individual retail agency.



Case Study – General Dyeing & Finishing Inc.

General Dyeing and Finishing Inc. (General Dye) is a batch dyeing facility located in Santa Fe Springs, California. The facility dyes approximately 30,000 pounds of fabric each day. Typical fabric types include cotton, polyester, and cotton/polyester blends. Approximate water use ranges between 450 and 560 acre-feet of potable water per year.

Case Study - Continued

Pilot Test – A one-day pilot test was conducted on October 15, 2002 using recycled water in one of the twelve large dye machines used at General Dye. Two tests were conducted, one using reactive dye with a cotton/polyester blend fabric and one using dispersed dye on 100% polyester fabric.

Both test loads used approximately 800 pounds of fabric and blue dyes. Identical means and methods of water softening, scouring, bleaching, and dyeing processed used by General Dye with domestic water were followed using recycled water. At the conclusion of the test, the staff did not notice any difference in the dyeing process or the quality of the end product when compared with potable water results.

Demonstration Test – A one-week demonstration test was conducted from November 20 through 27, 2002 based on the successful results of the pilot test. During this test, a large variety of colors and shades were used, ranging from very light to very dark. Test loads included cotton, polyester and cotton/polyester blended fabrics. Identical means and methods were again used in the demonstration test. The test was a success. No difference in the final fabric colors were noticed, including the lighter shades.

Textile Dyeing Process

- 1. Fabric Preparation
 - Desizing
 - Scouring
 - Bleaching
 - Mercerizing
- 2. Dyeing
 - Continuous dyeing
 - Batch dyeing – jig, jet, beam, and beck processing
- 3. Printing
- 4. Finishing

